An unnamed branch of the lingual nerve: Gingival branch

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Abstract

Our main aim was to study the mylohyoid nerve, but during cadaveric dissections an unnamed branch of the lingual nerve was encountered incidentally. Dissections of sublingual and pterygomandibular spaces on 13 cadavers preserved in formalin showed an unnamed branch present bilaterally in 11 specimens, which had not been identified before in any of the anatomical textbooks. The branch extended horizontally from the medial mandibular cortex at the level of the retromolar pad to mesial of the lower first molars-second premolars. It was supplying the lingual periosteum, gingiva, and mucosa that were overlying the medial alveolar process. The mean (SD) diameter of the left and right branches was 0.66 (0.1) mm at the branching side. The mean (SD) length of the right and left sides was 28.7 (4.4) mm. The mean (SD) distance from the alveolar crest was 5.8 (0.9) mm. The lingual nerve supplies the lingual soft tissues; however, none of the anatomical textbooks mention such a subdivision or a branch supplying that part of the oral cavity. We describe the site and the morphological characteristics of this unnamed branch, and recommend that it be named “the gingival branch of the lingual nerve”.

Keywords: Nerve branch; Lingual nerve; Lingual gingiva; Mandibular nerve

Introduction

The lingual nerve innervates the mucosa of the presulcal part of the tongue, the floor of the mouth, and the lingual gingiva. It emerges from the cover of the lateral pterygoid and proceeds down and forwards, lying on the surface of the medial pterygoid. It becomes progressively closer to the medial surface of the mandibular ramus until it is intimately related to the bone a few mm below and behind the junction of the vertical and horizontal rami of the mandible.1–3

Here it lies anterior to, and slightly deeper than, the inferior alveolar nerve. It then passes below the pterygomandibular raphe, and goes closely to the periosteum of the medial surface of the mandible, until it lies opposite the posterior root of the third molar, where it is covered only by the gingival mucoperiosteum. At this point, it usually lies 2–3 mm below the alveolar crest and 0.6 mm medial from the bone.2–4 It sends sensory branches to the sublingual space, and carries parasympathetic innervation from the submandibular ganglion to the submandibular gland.1,3,4

Anatomical variants of the terminal branches of the lingual nerve have been described,3,5,6 but we encountered an unnamed branch of the nerve bilaterally in 11 of the 13 cadavers that we dissected at the level of the right and left retromolar regions which was not described in either Terminologia anatomica or Gray’s anatomy.1,7 The branches continued suprapriostally over the mylohyoid on the lingual mandibular surface towards the midbody of each hemi-mandible. Taking account of its course and site, we recommend that it is named “the gingival branch of the lingual nerve”. Its presence is important in operations on the floor of mouth and the lingual alveolar gingival and mucosa.
Material and methods

We dissected the sublingual and pterygomandibular spaces dissections on 13 cadavers preserved in formalin, mean age 65 years. The cadavers were obtained from the Anatomy Dept. of Gulhane Military Medical Academy. A Carl-Zeiss OPMI1-FR surgical microscope and an Olympus Camedia C-3020 digital photo camera were used in all dissections. Permission had been obtained from the local ethics committee of Ankara Maternity and Health Academic and Research Hospital (Ref. No:5/16.10.03).

All measurements were made with digital callipers (Mitutoyo Solar Absolute Digimatic Calliper, Japan). The sublingual spaces were entered through a mandibulotomy (midline symphis osteotomy); the dissection started from the anterior lingual sulcus and progressed over the mylohyoid to each retromolar site. As the gingival branch was discovered at the branching site (Fig. 1.a), the branch was dissected distally throughout its course. The branching site was skeletonised by further dissection of the lingual nerve superiorly through the pterygopalatine space to the diverging site of the inferior alveolar nerve and the lingual nerve (Fig. 1 b). In addition, a fetus was also dissected to expose the horizontal gingival branch (Fig. 2).

We measured the diameter of the gingival branch at the branching site, the length anteroposteriorly, and its distance from the alveolar crest (Fig. 4).

Results

A thick branch of the lingual nerve was encountered on the medial side of each retromolar pad running between the lingual mucosa and the mylohyoid. The gingival branch leaves the lingual nerve in the inferior medial section of the retromolar pad before the lingual nerve continues into the sublingual space (Fig. 1a, 1b, 2, 3, 4). The course of the branch is horizontal along the lingual mandibular cortex, starting immediately at the branching site and terminating at the soft tissues over the medial cortex of midbody region or at the medial aspect of the second premolar (Fig. 1a,1b,2,3, and 4). Multiple ramifications of the branch were detected when it entered the lingual mandibular periosteum (Fig. 1b, 3, and 4).

The mean (SD) diameter of the right and left gingival branches were 0.66 (0.1) mm at the branching site (Fig. 4). They were positioned 5.8 (0.9) mm under the alveolar crests and were 28.7 (4.5) mm long anteroposteriorly (Fig. 4). The mean diameter of the lingual nerve was 2.7 (0.1) mm where it left the gingival branch.

Discussion

The anatomical textbooks describe sensory innervation of the retromolar pad, lingual gingival, and mucosa overlying the alveolar process medially as provided by the lingual nerve. None of the anatomical books either illustrated or mentioned the presence of such a branch innervating that region. The gingival branch seemed to innervate the lingual gingiva and alveolar mucosa between the sublingual sulcus and the lingual gingiva from the medial aspect of the retromolar pad to the medial side of the midbody in our dissections.

Kim et al. noted the same branches in 81.2% of 26 cases, and mentioned them as “collateral nerve twigs” that were entering the retromolar pad and innervating the lingual gingiva and alveolar mucosa from the last molar to the first molar. They accepted these “collateral nerve twigs” as a normal innervation pattern rather than a variation, because there were so many of them. There was also a thick branch of the lingual nerve located on the mylohyoid that was innervating the lingual mucosa and lingual gingiva. However, they exposed only its branching from the lingual nerve and its entrance into the lingual gingiva without fully dissecting the nerve.
twigs and the branch over the mylohyoid. The branch that was described by Kim et al. over the mylohyoid is the same branch that we dissected throughout its course.

Taking into account the diameter of the gingival branch, we think that it is a nerve made up of multiple small ramifications which that were dispersed throughout the lingual periosteum and the floor of the mouth. Indeed, multiple small ramifications that originated from the gingival branch could be seen in the microscopic dissection to be entering the lingual periosteum.

The position and course of the gingival branch could be important during operations in that region. Discovery of this branch would explain hypoaesthesia of lingual soft tissues although the lingual nerve is intact. Extraction of impacted lower molars, mandibulotomies, mandibular osteotomies, mylohyoid ridge reductions, mandibular fractures, lingual sulcoplasties, or resection of tumours in the retromolar pad may endanger the continuity of the gingival branch. The sensory disturbance on the lingual side after difficult extraction of impacted lower third molars may be related to manipulation of the mucoperiostal flap containing that branch, which is mostly confused with paraesthesia of the lingual nerve.

To prevent such surprises, blunt dissection should be preferred in the lingual aspect of the posterior mandible. Inadequacy of lingual anaesthesia after mandibular blocks should be attributed to the presence of the gingival branch of lingual nerve; that is why this nerve should be infiltrated at the retro-molar pad with medial inclination of a syringe simultaneously with a failed mandibular block.

Considering its course, site, and clinical implications, we recommend that this branch be named the “gingival branch of the lingual nerve (ramus gingivalis nervus lingualis)”.

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**Fig. 2.** The gingival branch (*) in a fetal mandible. The jaw was retracted laterally. LN=lingual nerve, S=symphysis, G=gingiva, T=tongue, MHYD=mylohyoid, GHYD=geniohyoid, SLG=sublingual gland, SC=subcutaneous fat.

**Fig. 3.** The gingival branch and the lingual nerve during the mandibulotomy approach. (The mandible and tongue are retracted with hooks). 1=gingival branch of the lingual nerve; 2=lingual nerve; 3=submandibular duct, sublingual papilla; 4=mylohyoid 5=geniohyoid, transsected; 6=anterior belly of the digastric muscle.

**Fig. 4.** The measurements made of the gingival branch (*) were A: length anteroposteriorly (black line); B: diameter of the branching site (red circle),) and C: distance from the alveolar crest (white dotted line). T=tongue, LN=lingual nerve, SG=submandibular gland, S=symphysis, MHYD=mylohyoid.
References


